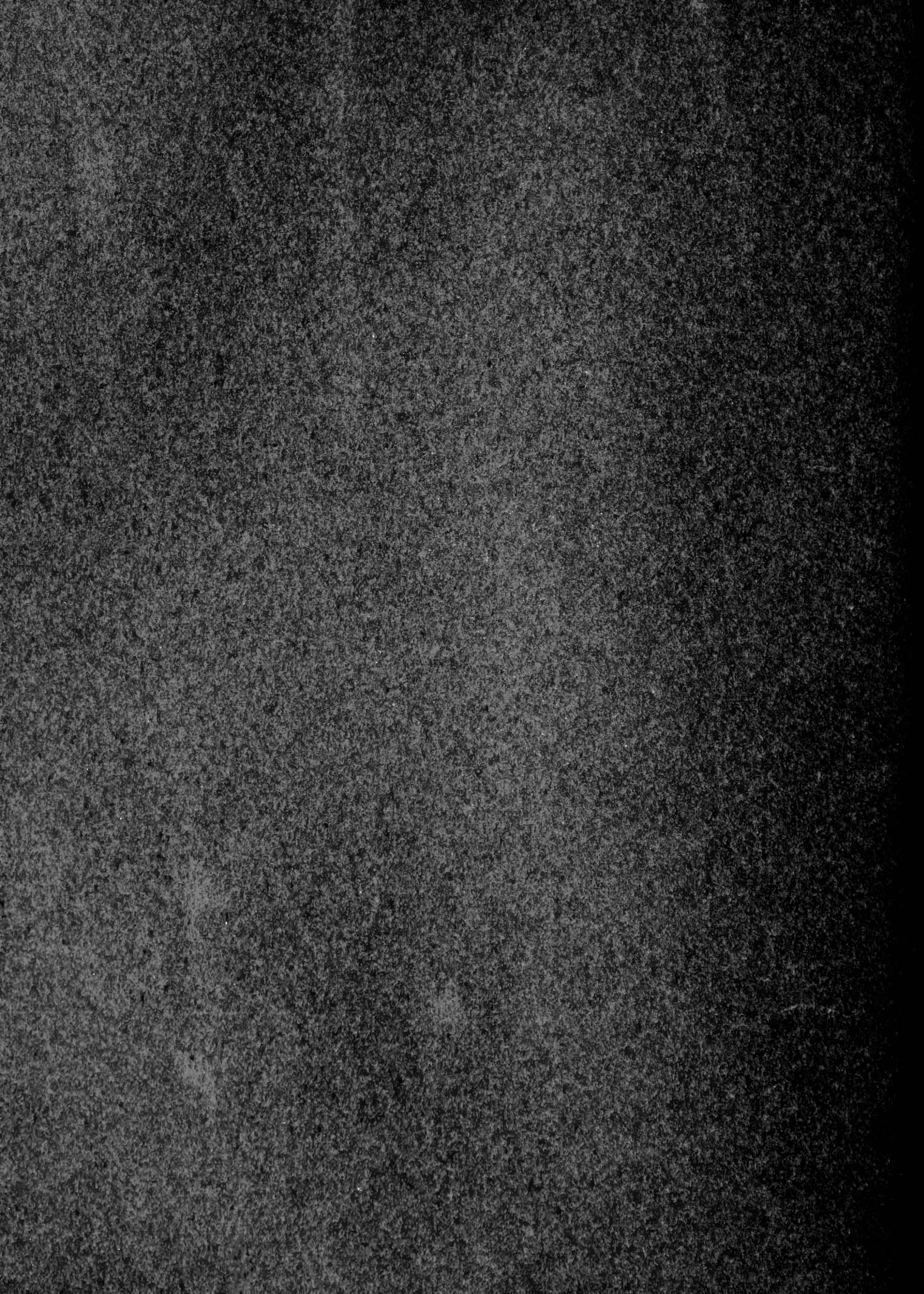


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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS

FOREST ECONOMICS
RANGE RESEARCH

AUGUST 1928





BRANCH OF RESEARCH

August, 1928

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THE PREPARATION OF MANUSCRIPTS

C. F. HUNN

In the preparation of manuscripts for submission to the Branch, one consideration to be taken into account is whether the manuscript is being sent in for the first time, or whether it is a revision. The reason for this is clear. The "new" manuscript is in all probability not going to the printer without being revised; it is, however, going to be sent out to members of the Board of Review, must make several journeys by mail, must be handled and read under all sorts of circumstances, and after all this is over at least one copy must be fit to file. Therefore, one of the prime requirements for new manuscripts is that they shall be bound, securely, with a complete set of all tables, charts, and photographs bound in each copy. The customary way of binding by means of punched holes and long brass paper fasteners is better than nothing. A much better way is that which the Laboratory has adopted, of having the pages wire-stitched into a solid book and paper or board covers fastened on securely by a strip of gummed cloth that forms the back binding along the stitched edge. If necessary, this work will be done by any local printer for a few cents a copy.

Any member of a Board of Review who has had to fight his way through an unfastened collection of thin-paper pages on a windy day in the office, or in the cramped quarters of a car seat, will appreciate without difficulty the advantages of binding manuscripts. This requirement applies also to revised manuscripts, although the need is not quite so urgent.

New and revised manuscripts should be submitted with at least two carbon copies, the original copy on heavy white paper, typed double-space. Each copy of the manuscript, as implied above, should be complete as to tables, charts, and photographs. Photographs should never be mounted on thin paper sheets. Where for any reason charts or photographs can not be duplicated in the field, provision should be made in the bound copies for their later insert, or else the manuscripts should be sent in unbound, so that they may be bound here after the duplicate illustrations have been inserted.

These few rules are all that need be followed in the preparation of new manuscripts. For revised manuscripts, however, some further observances are desirable, to save time and labor later, and to improve what may well be the final appearance of the manuscript.

The text of revised manuscripts should be paged by paragraphs; that is to say, no paragraph should run over the end of the page. Where it is impossible to avoid running over, the additional material can be pasted on the bottom of the page and folded up. It is well to begin every section or principal sub-section of the report at the top of a new page. There is never any objection to a short page, and it is always safe to start a new page, whenever there is any question regarding the paging.

(Over)

Manuscripts should, of course, always be double spaced with 1 or 1-1/4 inch margin on the left and at least 3/4 of an inch margin on the right. Page numbers at the bottom of the page are more useful than those at the top. There is no rule regarding paragraph indentations. If the beginning of the new paragraph is clearly indicated that is all that is necessary.

All tables should be on separate sheets of paper from the text, even where these are small text tables without headings or numbers. This is for the convenience of the printer, who probably will set up the tables on different machines from those on which the text is set.

The titles of charts or drawings should be inserted in the text, single-spaced and separated by three spaces top and bottom from the main text. The titles of photographs should not be inserted in the text but a list of these titles should be appended to the manuscript and the titles should also be typed on the sheets on which the photographs are mounted. Titles should never be typed on the backs of photographs, since typewriting invariably shows through and spoils the picture.

Footnotes should be inserted wherever possible directly below the line of the text in which is made the reference to the footnote. The footnotes can be single spaced and should be separated from the text by a ruled line running all the way across the page, bottom and top. They should be numbered consecutively throughout the manuscript.

Quotations from published works running to 3 or 4 lines or more should be written single spaced without quotation marks and separated from the main text by 3 or 4 spaces top and bottom. They can also be indented slightly.

Headings should be arranged in some order of importance. It does not matter how this is done, so long as the order of subordination is perfectly clear. All headings should appear in the center of the page, unless it is intended to have what the Printing Office calls "paragraph headings," which are simply italicized words at the beginning of a paragraph. This form of heading is not used very often in any of our publications. Where there are four degrees of heading, it is customary to write the main heading in capitals underscored, the second degree heading in caps plain, the third degree in small letters underscored, and the fourth degree in small letters plain. In the future it will be well to eliminate side heads entirely as they do not correspond to any printed headings that appear in our publications. This matter of writing the headings in different form to indicate their weight is something which is entirely up to the individual author or typist to decide, the only point being that the one who reads the manuscript should be able to judge

of what relative weight the heading is supposed to be. It would be sufficient to have all headings in the same type but numbered by hand throughout the manuscript as No. 1, No. 2, No. 3 and so on, according to the weight.

When the subordination of the headings has been decided on, the table of contents should be made up with indentations corresponding to the weights of the headings. The table of contents in the manuscript should correspond exactly with the headings and should neither contain items which are not represented by headings in the manuscript nor omit any that are so indicated. The printer does not generally print in the contents more than the main headings and principal sub-headings, but for the benefit of those who must review the manuscript before it reaches the printer a complete table of contents is desirable.

Photographs should be in the form of glossy prints and can best be submitted attached to separate sheets of paper, either 2 or 3 to a page or single, as the author may wish. The photographs should never be pasted to the paper but always affixed by tucking corners in slits in the page or by art corners. "NuAce" mounting corners are the only ones that I have found so far that are completely satisfactory for photographs submitted with manuscripts. The other kinds invariably become glued to the face of the photograph and require a lot of time and trouble on somebody's part to get them unglued, unless it happens that the photograph can be trimmed to omit the corners. Photographs not from our collection should always be submitted in triplicate if possible. Sometimes this is not possible and in such instances the photographs can, of course, be rephotographed in Washington and copies made. It is desirable that the photographs should be submitted full-size, and that if the author desires any part of the photograph to be omitted he should indicate this on the sheet to which the photograph is affixed. The plate number and title should of course be on this sheet. Where two or more photographs are to be part of one plate these can be designated "A", "B", "C", etc. The Department no longer uses the designation "Plate I, Figure 1," but instead "Plate I, A."

It will, of course, be understood that none of the above rules are unalterable or that there will be any prejudice against manuscripts in which they are not all observed. They are merely for the purpose of indicating what constitutes a reasonably desirable form in view of the processes through which manuscripts must go in the course of review, editing and publication.

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FOREST EXPERIMENT STATIONS

Washington

General

During August the Washington Office was sadly depleted with Marsh still continuing upon his trip to the western Districts and Stations, Mr. Clapp visiting some of the eastern Stations, Reineke and Munns being away half the month, Chapline still in the West, Clements working at the Central State's Station, Sparhawk in Wisconsin, and other members of the force taking vacations to escape the typical Washington summer.

The reports for the Mississippi Flood Study began coming in and have been arriving at sporadic intervals. Compilations of one kind or another have been going on during the summer in preparation for the rush on this work which will take place later in the fall.

Personnel

The personnel situation continues to grow acute, for Westveld, from the Pacific Northwest and Wheaton from the Northeastern Station, have both resigned. There have been so far 7 resignations this fall and there was one hold-over vacancy, making 8 positions which need to be filled. These resignations, coupled with a number who have gone on furlough this year, are making the directors' jobs even more difficult.

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NORTHEASTERN FOREST EXPERIMENT STATION

Munns joined Boyce at the International Entomological Congress at Ithaca the middle of August. From there they made a trip through the Adirondacks to get a general idea of forest conditions in that region. Near Boonville, New York, some splendid Scotch pine was seen; in fact, one of the few plantations of this species that would lend any encouragement to its continued use in artificial reforestation. They also attended the dedication of the New York State Ranger School at Wanakena, which was followed by a conference on secondary forestry education. They next visited an experimental forest at Gale River, New Hampshire, where Wheaton has been establishing permanent sample plots in even-aged stands of spruce and balsam fir, and in mixed stands of spruce and hardwoods. Munns' visit was concluded by joining the party of state foresters and members of forest school faculties on the trip through the White Mountain National Forest, which was sponsored by the Forest Service.

Westveld spent the first week of August in the Waterville valley of the White Mountain National Forest, establishing permanent methods of cutting plots, one of which was in a stand composed of nearly pure spruce, and the other in a stand consisting of 50% spruce and the balance of hardwoods - beech, yellow birch, sugar and red maple.

On the 12th of August, Spaulding and Westveld left for a trip to Newfoundland to make a detailed examination of a series of methods of cutting and slash disposal plots, established in 1920 by the Anglo-Newfoundland Development Company. Twenty-four contiguous six-acre sample plots in the spruce type were laid out in the form of a rectangle, representing (1) clear cutting; (2) clear cutting in groups; (3) clear cutting in strips; (4) leaving carefully selected, apparently sound, wind-firm trees; and (5) diameter limit cutting. Three methods of slash disposal were practiced: (1) burning slash in piles during winter logging; (2) lopping slash during logging; (3) leaving tops untouched. The idea behind all this was to determine, if possible, whether the carrying out of any of the silvicultural systems enumerated would result in producing a stand of reproduction predominantly spruce. None of the methods of cutting has produced a satisfactory stand of reproduction from the standpoint of composition, the main difficulty being that the advanced reproduction consists mainly of balsam fir, and subsequent spruce reproduction is insufficient to affect appreciably the final composition of the reproduction.

Professor L. H. Nichols of the University of Alberta, Edmonton, visited the fire weather station at Petersham, Mass. Professor Nichols is engaged in making a survey of fire weather research for the Quebec Forest Industries Association, which includes all of the most important timberland owners in the Province of Quebec, and which is cooperating with the Dominion Meteorological Service in maintaining weather stations throughout the woodlands of Quebec in the interests of fire protection. The Association buys and maintains the meteorological equipment, while the Dominion Meteorological Service furnishes the Association with fire weather warnings.

Under the direction of Gast, a soils laboratory is being set up by the Harvard Forest at Petersham, Mass., which will be equipped to make nitrogen as well as routine soils analyses. Doctor Romell of the Department of Forestry, Cornell University, spent several days at the Harvard Forest, and was greatly surprised at the various soil types which exist in the vicinity of Petersham.

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CENTRAL STATES FOREST EXPERIMENT STATION

General

The last week of the month brought Assistant Forester Clapp to the Station. Accompanied by McCarthy and Dr. H. C. Sampson of the Botany Department of the Ohio State University he made an extensive trip through southern Indiana, west central Kentucky and southern Ohio. This included the glaciated sections of Ohio and Indiana as well as the Knobs, western coal field, Pennyroyal limestone, and blue-grass regions of Kentucky. A very hilly belt in the blue-grass region is created by the outcropping of the Eden shale.

Interesting observations of the trip were the extent to which beech forest extends south of the Ohio River and the present practice of liming farm lands in the unglaciated limestone Karst region southeast of Brandenburg, Kentucky. This practice of liming land which was of limestone origin is evidence of the completeness of leaching of this top soil.

Forests in Relation to Flood Prevention

Instructions were received for the revision of the Ohio Valley section of this report. The purpose of revision is to bring the report up to date with any additional information available and to prepare the report for publication. Kellogg and Hanley were called into Columbus to assist and State agencies were consulted again to secure any new information which might have accrued since the requests made a year ago.

Kellogg made a trip to southwestern Pennsylvania to check up on damage done to the forest by coke oven gases and the resultant erosion, he returning by way of the Little Kanawha River and the eroded section of southeastern Ohio in Washington County.

The field work of the past year gave members of the Station staff opportunity to study conditions at first hand in Ohio, Indiana, Illinois, but their work on other projects has not taken them into much of the southern part of the Ohio Valley.

Plantations

During the month, measurement of forest plantations was continued and finished in Indiana. Junior Forester V. A. Clements of the Washington office joined the crew at Huntington, Indiana. Gordon and Clements carried on the measurement work and finished the remaining list of plantations in central Indiana.

In the course of this work throughout the state, it has been found that black walnut has been the species most commonly planted by land owners. High prices paid for walnut logs and to some extent the value of the nut crop account for this choice. The crew moved into Illinois and commenced the measurement of plantings owned by the University of Illinois at Urbana. Several days were spent on these plantations and others in the immediate vicinity. Clements then left the work to join Day's crew on the oak yield study in Virginia, and was replaced by Bower. The balance of the month has seen the crew through a portion of central Illinois.

Of ninety plantations visited in Illinois during the month, only those at Urbana and at the State Teachers' College at Charleston, had not been pastured at some time or other. Many of the plantations have been pastured continuously with all kinds of stock. Indeed, the majority of present owners and tenants consider that planting trees on good agricultural soils is unprofitable in terms of timber crop, but that the plantations are of the greatest value as shade and shelter for stock.

Oak Study

Day and Winters worked through the Valley of Virginia from Staunton south during the month. Heavy rains in the first part of the month impeded their work very materially and the fact that only hardwood stands of less than 75% of oak were measured, made necessary a great deal of travel for the stands found. They expect to finish their work in this section early in September.

Forest Types

Gordon has continued to carry a record of the types of natural vegetation in the course of travel and has taken additional data on Indiana. Illinois is being covered in coordination with the travel entailed by the plantation study in that state.

Dr. Sampson kept a record of the forest types encountered through Kentucky on the trip made during the last week of August.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Field work was continued on the studies of chestnut replacement, fire damage to forest soils, methods of cutting (hardwoods), and forest entomology and pathology. The work was interrupted by frequent rains.

A heavy downpour on August 15 caused floods of the rivers near Asheville; much damage was done to highways, railroads, and farm crops. Determinations of the amount of suspended matter in streams draining forested and non-forested lands, which were made by Körstian while the streams were in flood stage, are shown on another page.

R. D. Garver's presence in the region was used to advantage for an inspection of the Berea College wood-working plant at Berea, Ky. Garver and Frothingham spent August 2 and 3 in the plant and on the forest tract of the College to suggest means of increasing and improving the utilization of wood from the College forest, as a part of a proposed plan of management. This plan will necessitate a cruise, type map, and compartment division of the forest. This work was originally planned for the present summer but had to be deferred owing to the heavy foliage and the lack of an adequate knowledge of outside boundaries. Before Frothingham left Berea, the College agreed to perfect the outside boundary survey during the fall. The general lines of the cruise, map, and working plan were also discussed and agreed upon.

Methods of Cutting-Hardwoods (Mc-2)

Buell replaced Haasis at Berea and the two parties were combined. They were engaged practically all of August in the remeasurement of four sample plots and in incidental work. Because of variations in stocking which exist in one of the plots (plot 4) it was decided to divide this plot in three parts, two of one acre and one of .8 acre. Quadrats were established in the control plots.

One pair of plots was burned over last fall, and future observations will throw light on the process of restocking after fire. On the other plot the extremely rapid growth of the reproduction has continued, although definite figures must await compilation of the quadrat measurements. The reproduction is now badly in need of disengagement cuttings, and it is proposed to begin cutting experiments on one or more of the divisions of the plot.

Chestnut Replacement

MacKinney spent practically the entire month in the field on chestnut replacement work. Two one-acre permanent sample plots were established on the Natural Bridge National Forest where Forest Pathology had previously established plots to study the death rate of chestnut. One plot was laid out in the chestnut-red oak type on a north-facing slope where chestnut comprised 80 per cent of the stand by basal area. The other plot was established on a south-facing slope in the chestnut-oak-chestnut type in which chestnut comprised 75 per cent of the original stand. These areas were selected for plots because of the high percentage of chestnut in the stand. They will also be interesting because the stands have not been subjected to either cutting or fire in the last 25 years.

On these plots all trees over one-half inch in diameter were tagged and described and horizontal crown projection maps were made. In addition 40 milacre quadrats (each 6.6 feet square) were established on each plot; on these all arborescent vegetation was tagged. If any person desires information on working in the rain and in the clouds, the annals of this work will be a revelation.

Influence of Forest Cover Upon the Load of the Streams Near Asheville During the Flood Stage of August 16-18

On August 15 a heavy rain occurred in the mountain region; 4.42 inches fell at Asheville. Rain was recorded at Asheville on eleven of the fourteen days of August preceding the storm, with a total of 3.47 inches. Since the rainfall in the mountains is usually considerably higher than at Asheville this was probably the case this August. The rain of the 15th resulted in a twelve-foot flood stage in the French Broad River at Asheville.

At the request of McCarthy, for use in his flood study report, Korstian obtained a quantitative expression of the relative amount of suspended matter carried by flooded streams draining cleared and forested lands. Samples of water were collected from various streams near Asheville and determinations of the load were made. All the streams were in flood stage when the samples were collected. The results are shown in the following tabulation:

| Approx. percentage of forest land on watershed above point of sampling. | Amount of suspended matter in parts per million.* | Kind of suspended matter |
|---|---|---|
| <u>Per cent</u> | | |
| 90-95 | 11 | : :Mostly particles of :organic matter, some :fine sand. |
| 40-45 | 107 | : :Organic matter, fine :sand, silt and clay. |
| 95 | 4 | : :Mostly particles of or- :ganic matter, some fine :sand. |
| 10-15 | 4,370 | : :Mostly clay and silt, :some fine sand, very :little organic matter. |
| 30-35 | 3,405 | : :Mostly sand, some silt, :little organic matter. |

*Determined on basis of dry weight of suspended matter per weight of given

From the precipitation records it is evident that the soil and the litter of the forest floor had been well saturated during the rainy period of August 4 to 12, on the last two days of which over one and a half inches of rain fell. The saturated condition of the soil and forest litter resulted in heavy run-off from the forested land, as well as the cleared land, during the storm of August 15.

The chief difference, however, lay in the much greater load of suspended matter carried by the streams draining the cleared land. The large amount of material carried from the cleared land can only be fully appreciated when considered in conjunction with stream flow records of which none are available for this flood.

The nature of the load carried by the streams arising in the forested areas also affords an interesting comparison with that carried by the streams arising in or flowing through cleared land. The suspended matter contained in the water of the forest streams consists chiefly of particles of organic matter as minute pieces of leaves, partly rotted wood, etc., and a small amount of fine sand, while that contained in the water of the streams draining cleared land is mostly clay, much of which is colloidal, will remain in suspension indefinitely, and is capable of being carried long distances with some silt and sand but very little organic matter. In one case the load carried by the stream was mostly sand which was undoubtedly carried along for short distances at a time but was successively dropped and picked up again. The streams with a high percentage of forest cover on the watersheds were strikingly clear, while the streams draining large areas of cleared land were unusually turbid, particularly those carrying a heavy load of clay and silt.

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SOUTHERN FOREST EXPERIMENT STATION

General

The revision, for printing, of our 1927 reports on the effect of forests in controlling erosion and floods in the Red River and Lower Mississippi Basins occupied most of Demmon's time until the middle of the month. Wakeley, Righter, Barrett, Wahleberg, and Lentz assisted in much of the work, and the office force was taxed to capacity to get the revised reports typed for transmittal to Washington.

P. M. Garrison and Bryant Bateman, of the Forestry Department of the Great Southern Lumber Company, went over the Urania thinning plots with Barrett preparatory to making thinnings on the company holdings near Bogalusa.

Protection, Fire

Barrett began a progress report on the Urania fire plots. He also made the two summer burns in the Greeley Pasture, assisted by Hayes and Righter, and set iron fence posts in place of the wooden stakes at the corners of several plots.

Management

Barrett made a final revision of his form for field notes on thinnings. He and Righter and Hayes spent the last third of the month at Urania, where they laid out nineteen new thinning plots. Some of these plots are as yet only tentative.

Measurements

Barrett practically completed the study of accelerated growth of longleaf pine left after logging at Urania.

Naval Stores

At Starke it was found necessary to scrape the French faces and the narrow American faces, since the aprons which were put on with the French setting tools were designed for $3\frac{1}{2}$ in. faces, and would not take care of the larger faces which we placed on our trees. The jump streak at Kingsley is causing trouble, since the scrape builds on so thick that fresh gum drops clear of the tins and wastes on the ground. It will be necessary to punch scrape from these faces.

Although the dip at Dukes remained fairly high, the dip in August at Union, Kingsley and Sampson showed a decrease, due in part to the series of storms which occurred during the first two weeks in August and caused the faces to become chilled and the longleaf trees to build up scrape instead of yielding gum.

The checking over of the old records on the Powell tract is about two-thirds completed. Considerable progress has been made on tables and computations needed for the proposed bulletin, particularly along basal area and stand density lines.

Forestation

Hayes spent the first half of the month on the joint bulletin he and Wakeley are writing on the survival and early growth of commercially planted southern pines at Bogalusa.

Over the greater part of the experimental and commercial plantations at Bogalusa, unusually good growth has resulted from the generally favorable weather conditions.

Wakeley and Trist collected half a bushel of slash pine cones, the first we have been able to obtain since 1924, from young trees in southern St. Tammany Parish.

Diseases

At Bogalusa the longleaf seedling plots sprayed throughout the summer with Bordeaux or with lime-sulphur show scarcely a trace of brown spot infection, while the unsprayed checks are very thoroughly browned by the disease. These spots should in time yield information on the stunting caused by the brown spot. Spraying is being continued because the fungus is still fruiting.

In the 800-acre burn in young longleaf, brown spot, while not heavy, is noticeable almost everywhere. The fire, which was unusually severe, defoliated practically every seedling on the area prior to the first infection last spring, and the reinvasion of the area by brown spot seems to indicate the futility of burning to control the disease.

Insects

Wakeley's incidental work on tip moth on loblolly resulted in attendance at the Fourth International Congress on Entomology, held at Ithaca. Such sessions on forest entomology as were attended were stimulating and instructive; Dr. Trägårdh's paper on detailed study of insect fauna of dying trees, Dr. Graham's on larch sawfly, Dr. Eidmann's on ants in the forest, and Barnes's on the white pine weevil, were particularly good. Wakeley also had opportunity to compare notes with Mr. Middleton, of the Office of Forest Insects, on the approach to research problems in general, and entomological problems in particular.

The end of the month saw the fourth tip moth flight in full swing at Bogalusa, bearing out our prediction based on the random notes of previous years.

At Archie in Catahoula Parish Lentz and Putnam found the overcup and swamp red oak being defoliated by a small beetle.

Hardwood Investigations

In the cypress region of Louisiana many of the mills are about cut out. The mill of F. B. Williams at Franklin (the largest cypress mill

west of the Mississippi) has cut its last week's supply of cypress. Other mills have shifted largely to tupelo gum, and much tupelo is going into box manufacture.

Products, Pathology

Lindgren spent the early part of August getting oriented at the New Orleans office, and taking care of the many details which are always involved in establishing new headquarters. The remainder of the month he spent in a field survey of the sap-stain situation in pine and hardwood mills in Mississippi and Louisiana. The purposes were to determine the incidence of stain in both logs and finished products, its seasonal occurrence, and economic significance, and the control measures now being employed and the degree of success attained by the different methods.

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CALIFORNIA FOREST EXPERIMENT STATION

General

Of outstanding interest this month was the visit of R. E. Marsh who spent three weeks with us, dividing his time between office conferences and trips to field projects. A visit of such length from a Washington official, giving time for unhurried conversations, is stimulating in a way which is perhaps too often overlooked when itineraries are planned in Washington. Let us have more of the same sort.

Late in the month arrived E. L. Demmon, Director of the Southern Station, to spend a month in California. After a few hours in the office he continued on to our Feather River field station where Kotok, Dunning, and Siagins were examining management plots and preparing for "going fire" observations should the opportunity arise. Kotok incidentally put in some time on the manuscript of the statistical analysis of southern California fires.

Management

Nature's Reproduction. The annual counts of cones on numbered trees were completed for the Stanislaus and Lassen areas. The present season promises an exceptionally heavy seed crop of all species in most localities. Counts of maturing cones compared with counts of one-year cones for the same trees last season bring out strikingly the importance of insects, especially in sugar pine. Good seed trees may be completely

stripped of cones before the seeds mature. These repeated counts bring out the importance of noting past seed bearing from cones on the ground when selecting seed trees in marking. Certain large full crowned trees have no cones, in this heavy seed year, and the absence of old cones on the ground indicates that they have not borne for many years in the past.

Reproduction plots on the Plumas Nc area were reexamined for the 17th year since logging. Losses from drought were very heavy and practically no new seedlings were found.

One hundred and fifty screens have been made for controlled seeding in the sugar pine - fir type on the Stanislaus. These will be placed this fall when new seed is collected.

Slash Disposal Study

During the last week of July and the first two weeks in August Wieslander concentrated the type map crews on a slash disposal study in western yellow pine - white fir type on the east side of the Lassen Forest, to determine the survival and development of advanced and subsequent reproduction both on areas where slash is piled and burned and where slash is left in place. Two one-acre plots which had been laid out and mapped in detail during August 1927 were logged and remapped this year. The slash was piled on one plot and will be burned this fall. Next summer permanent plots will be laid out within these areas.

Cover-Type Map

The remainder of August was spent on the cover-type map in Lake County, 10 townships being completed.

Wieslander spent a few days with the redwood lumber companies in Mendocino County, enlisting their cooperation. The Caspar and Albion Lumber companies have just had the Fairchild Company complete an aerial map of their holdings. This, together with their cruises by forties, will be made available to the Station. The Forester of the Union Lbr. Co. and its subsidiaries, the Glenblair and Mendocino Lumber companies will themselves make a cover map of their holdings.

Planting

Early in the month Kraebel, accompanied T. D. Woodbury, of the District Office, visited the headquarters of the Lassen Forest to assist in planning a new forest nursery for the production of western yellow and Jeffrey pine stock for the Lassen and Plumas forests. The nursery will

be located on county land (in the town of Susanville, elevation 4,271 feet) which the Government has an option to purchase on very favorable terms. Production of 1-1 stock is planned to be 250,000 in 1930 (equally divided between the two species), 500,000 in 1931, with the possibility of increasing to an ultimate maximum of one million trees per year. Small quantities of white fir and incense cedar will also be raised. The planting program counts upon covering, within 10 years, a total area of 9,000 acres now in need of planting on the Plumas and Lassen forests.

Forest Influences

Most of the month was spent by Kraebel in the office, partly on the influences study and partly on routine supervision during the Director's absence in the field. Some time was devoted to conferences with visiting officials and scientists, of special interest being the visits of Knowles Ryerson, R. S. Goodridge, and Hugh H. Bennett. Through Ryerson we have been receiving exotic seeds and plants for the Devil Canyon Nursery and during his visit we made plans for further consignments; Goodridge showed an exhaustive manuscript compilation of hydraulic principles and methods involved in the study of flood flows which was prepared in the Los Angeles Flood Control office, and discussed cooperating with us on the forest influences study; Bennett spent two days in the office examining our work and discussing the subject of erosion as a regional and national problem. After seeing some of our erosion photographs, Bennett went south with Lowdermilk to visit some of the more striking examples on the Santa Barbara Forest and to inspect our work at Devil Canyon. After a discussion with Nelson (of the District Office) and Kraebel, Bennett planned to return to California next year and spend more time on a survey of erosion in the state.

The water cycle experiments located at Berkeley have been continued by Lowdermilk during the month of August. The data covering 80 runs, with an application of approximately 160 inches of artificial rain are being worked up. The erosional data are worked up to date.

Several conferences on the problems in water cycle investigations were held by Lowdermilk with Professor Doctor Albrecht Penck, Professor of Geography, University of Berlin, who has been giving a course of lectures in Berkeley. A recent publication by Prof. Dr. Albrecht Penck is a suggestive study of rainfall, run-off, and evaporation of the Colorado River basin. The work contains an excellent working bibliography on this problem. A copy of selected references is being sent to Washington and to Director Raphael Zon. The work itself is recommended for study by those interested in the problems of the water cycle and water conservation and water control.

Forest Products

Lumber Census. The last stragglers have been rounded up after a more-difficult-than-usual job of riding herd on the 1927 lumber census. The stumpage returns were also rechecked and summarized, and suggestions made to Washington, at their request, in respect to the proposed revision of the Form D distribution return.

Ways and means are being devised to overcome some of the troubles we have had in the past due to the practice of employing a temporary assistant from outside the Forest Service organization. This scheme involves such detailed supervision, to make it work satisfactorily, as to prove false economy. (One wonders how we are to get well trained and experienced personnel with such economy! - E.N.M.). The plan followed in District 6 of detailing a Junior Forester to the job for a few months may be adopted in District 5 in the future.

Total production of California mills last year was about five per cent less than in 1926. Mills cutting less than 200 M. feet for the season contributed only two-tenths of one per cent of the total production while entailing most of the follow-up grief.

Blue Stain. The preliminary report on the Fungimors dipping experiments was forwarded to the Laboratory, although we have not yet received the verdict of the cooperator, to whom the report was mailed last month. Whether the company will go ahead with dipping on a commercial scale is not known. The results appear to justify the expense of treatment although further tests, based on leads more or less definitely indicated by present data to improve the efficiency of the process, are necessary before any hard and fast rules can be laid down specifying the optimum concentration of solution and period of immersion which should be used.

Heptane. The field work on this project is progressing well. Analysis at the Forest Products Laboratory of samples taken in 1927 has showed one tree, the first thus far found, whose oleoresin contains a mixture of heptane and terpenes. Further samples are being collected from this tree, in order to check this very unexpected finding.

An interesting conference was had with a Mr. Ernst, who is starting turpentine operations in private second growth western yellow pine in the Sierra Nevada foothills adjacent to Nevada City and Grass Valley. He has a very ambitious program which contemplates a million-cup operation, and he claims already to have secured options on timber amounting to three-fourths of that amount. He appears to be a thoroughly informed, capable and straightforward man who may establish a significant industry.

Knotty Top Logs. Mention was made last month of our cooperation with Forest Management in conducting a minor mill scale study to determine the validity of a complaint which had been made by a purchaser of

Government stumppage. The operator contended that the Forest Service was not justified in requiring him to bring in certain types of big knotted top logs because the per cent of No. 5 common (cull grade) lumber resulting from such rough material, when added to other defects, made the logs unmerchantable under the terms of the contract. Company officials selected the logs for the test run. One hundred of them were boomed in the pond and they were indeed a tough looking assortment. That they were not as "hard" as they appeared, however, is evident from the summary of results. About 11 per cent of the total cut of 66,176 feet B. M. was graded as No. 5 common and only three-tenths of one per cent was thrown in this cull grade because of knots alone. The balance of 10.8 per cent was culled because of rot and shake. Of the 89 per cent merchantable yield from all species (western yellow pine, sugar pine, white fir, and incense cedar), about 40 per cent was No. 4 common and 30 per cent No. 3 common. In the pines alone approximately 40 per cent was No. 3 shop and better and about half of this was No. 2 shop. The results seem to justify the Forest Service requirement of the utilization of such logs.

Durability. After consultation with the Secretary-Manager of the California Pine Association, a letter was addressed to him respecting the feasibility of constructing window sash with the bottom rail extending clear through, instead of the side rails, as is now common practice, in order to reduce the liability to decay due to retention of storm water.

Cost Accounting Scheme. The development of a cost accounting scheme for the Products office was made necessary in order to make complete for this Station the cost accounting procedure laid down for all Experiment Stations, effective July 1. A scheme was worked up by Mr. Hill and discussed with Mr. Marsh, after which it was forwarded to Washington with recommendations in respect to certain features as applied to the Experiment Station scheme and other Products offices.

Entomology

Our studies on biological control and attraction of the western pine beetle have been continued through August. With the use of the new type of sheet metal cage we have been able to determine the effect on both the western pine beetle and the beneficial clerids of different periods of exposure of infested bark under a variety of conditions. Because of the much greater mobility of the clerids, when compared with the western pine beetle, it is possible to treat infested trees in such a way that the clerids are driven out of the bark, leaving the pine beetle broods to be killed by sun-curing or by burning. It is hoped that we will be able to develop a method of treating infested trees by which the pine beetle broods can be killed without killing the beneficial insects. It was found that in infested bark exposed to full sunlight the mortality of the pine beetle broods was much greater than the mortality of the beneficial clerids.

The greatest difficulty encountered in our attraction work is to develop a technic for determining the comparative attractiveness of the different substances used. Small, fine-screened traps on the principal of the fly trap are now being experimented with.

Biology

Porcupine Investigations on the Lassen and Modoc Forests. A period of three weeks during latter July and early August was devoted to checking porcupine damage and methods of control with members of the Forest Service and Biological Survey on the Lassen and Modoc Forests. Application of control measures, especially on the Modoc were giving some immediate results. This was especially true of poison-containing blocks placed in suitable trees about the summer feeding ground. Fourteen dead porcupines were found around four such stations. Many of the dens in lava rocks were not used by porcupines at this time of the year, and kills from poison placed in these dens cannot be expected until such time as the animals again make use of these rocky shelters.

The reaction of porcupines in this region offers an excellent example of conditions intermediate between those encountered on the Crater National Forest in Oregon and in the entire western yellow pine belt of Colorado, New Mexico, and Arizona. In western Oregon porcupines occupy dens for shelter and protection - rarely, it is stated, spending the day sleeping in a tree. In northern California, eastern Oregon, and the entire Southwest the porkies are given to sleeping in trees by day and foraging by night for ground vegetation. Very few dens occur in the Southwest, and the few that can be found are not used during the summer.

Porkies, adjusting their activities and movements to food conditions tend to spend their summer feeding along the streams and natural meadows or cultivated areas in these two northern Arizona forests. From 50 per cent to 95 per cent of the young growth along some of these feeding places is girdled to varying degrees. Feeding upon cambium became more noticeable during August, and stomachs of the animals displayed greater quantities as the month advanced. Should these porkies react as do their relatives in the Southwest and in western Oregon, feeding upon cambium will increase as the fall advances and ground vegetation becomes drier and less plentiful.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

Advisory Council Meeting

A meeting of the Forest Research Council was held in Tacoma, Wash., August 14, primarily to give Professor Fairchild an opportunity to present his plans to this body of representative lumbermen and foresters and get

their advice and endorsement. The meeting was held in conjunction with the Forestry Committee of the West Coast Lumber Manufacturers' Association. The Council passed a resolution endorsing this study which will accompany their questionnaire. At this same meeting the forest survey authorized by the McSweeney-McNary Act was discussed and a resolution was passed favoring its early inception in the Northwest.

Westveld Resigns

The Station has suffered a severe loss by the resignation of R. H. Westveld who leaves September 15 to take an assistant professorship in the Michigan State College Dept. of Forestry. He will teach silviculture and wood technology. Westveld has been with the Station three years, engaged almost entirely in the western yellow pine region in the study of slash disposal and methods of cutting. The manuscript of a bulletin resulting from his studies on the former topic is now in the hands of the reviewers.

The Pack Demonstration Forest

The Pack Demonstration Forest of the Univ. of Washington near Tacoma was visited by Munger for the first time this month. It is a tract of about 1600 acres of which something less than a section is virgin timber, and the remainder logged-off land or young growth. Activities so far have been chiefly of a development nature. A sawmill for the logging of some fire-killed timber is now under construction and several miles of truck road have been graded this season. The beginnings of some reforestation and other experiments give promise of the possibilities of this area as an educational and research center.

Testimony Before the I.C.C.

In the hearings for the proposed cross-state railroad, Munger gave testimony, at the request of the Public Service Commission of Oregon, as to the potential growth of the forest lands of western Oregon. The purpose of his testimony was to bring out that the timber tonnage for the proposed railroad would be continuous if the lands were kept reforesting, and that the potential freight should be reckoned according to the productive capacity of the ground and not merely on the basis of the present virgin stand.

Cone Crop Reports

Cone crop reports, which have this year been revived according to a new scheme, have been coming in from all the Forests and are the basis for a good picture of the cone production the district over. Again for the fifth consecutive year the Douglas fir crop in western Oregon is very light.

Douglas Fir Slash Disposal

McArdle's time has been spent entirely on the Douglas fir slash disposal project. Eight new plots in freshly cut slash were established and five other plots re-measured. Since McArdle will resume his studies at the University of Michigan and a preliminary report on the slash disposal project is to be prepared this fall, his time has been devoted to computational work and analysis of data already secured.

Computation so far made of the volume and distribution of size classes of material left after logging indicates a variation between rather wide extremes. From 900 to 14,000 cubic feet of logs (larger than 3 inches in diameter) have been found on acres in typical Douglas fir logging operations. In addition to this, there appears to be from about 50 to over 200 cords of branchwood, small slivers and twigs per acre. Fires appear to remove usually about 95 per cent of the finer material and from 9 to 50 per cent of the coarser material, according to its arrangement, for if the logs are much cross-piled, a volume proportionately large is removed by the fire. To date 44 permanent plots have been established and 9 plots have been burned and re-measured, a total of 53 plot measurements upon which to draw for information.

Natural Reproduction of Douglas Fir

During the month Isaac made the periodic examination of the Douglas fir natural reproduction plots in Washington and Oregon. He also spent four days with J. L. Alexander, who is employed for the summer by the Western Forestry and Conservation Assn., studying the reforestation situation in Grays Harbor County. Isaac's impressions were that the natural reproduction in the fog belt was even more unfavorable than in the fir belt, in spite of the humid climate, estimating that 75 per cent of the cutover land is not reforesting satisfactorily. Good seed crops of Douglas fir, western hemlock, red cedar, and Sitka spruce do not seem to occur as frequently in this region as elsewhere, and very little reproduction of any species was found to have come in since 1924.

Western Yellow Pine Growth and Yield

Meyer and party continued their investigation of old cutting areas of western yellow pine. Up to date, many areas on the Deschutes, the Crater, the Fremont Forests and adjacent territories have been visited, some of the cuttings being as much as 42 years old. In every region one striking condition has been noted which will cause trouble when the data are compiled. The increment cores of many trees, especially of those of intermediate degrees of release, show an abrupt dropping off in growth during the last few years. This decrease is entirely independent of the length of time since cutting, as it occurs on 15-year-old cuttings as well

as on those 25, 37, or 42 years old. The only explanation, of course, lies in unfavorable climatic conditions, most probably in dry weather cycles. This falls in line with Hanzlik's observation, that the growth percentages of western yellow pine on the Wallowa National Forest for the last period of years have been below normal. For this reason alone, many cuttings under 15 years of age are now being left untested.

Western Yellow Pine Mill Scale Study

Westveld measured 800 test trees for the mill scale study at Bend. The trees were described as they stood, and following logging additional records as to their age, dimensions, etc., have been taken.

At Wind River

Simson's time went in almost entirely on the study of weather and fuel relationships, aside from the current routine. He has constructed a homemade xylometer in order to test the volume of various kinds of forest fuels.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Two members of the Station staff, gave most of their time during August to cleaning up their work preparatory to departure for other fields. Marshall leaves to commence advanced study under Dr. Livingston at Johns Hopkins, while Kempff commences his new work with the Idaho Forest Experiment Station. Kempff's successor has been chosen tentatively and should be on the job before the end of the month.

Kempff's resignation necessitated a complete checking of all the property at the Priest River branch station. This was done by Mrs. Troop. As a result a large volume of worn-out and useless property was condemned and destroyed, the files greatly improved, and the future efficiency of the entire plant promoted.

Besides completing some reports concerning the continuation of his field work, Marshall completed the establishment of a new two-acre methods-of-cutting sample plot, representing standard Forest Service practice in the western white pine type. The residual stand consisted of fifteen white pine seed trees ranging from 9 to 35 inches diameter at breast height. There were also three larch and two Douglas fir seed trees. In addition 450

cedars, hemlocks, and white firs from 0.6 to 30 inches were left. It is the commercially inferior species which constitute the most serious silvicultural problem in the white pine type. A large share of them are defective, and even when sound they have a negative stumpage value of about \$6.00 a thousand. Yet they cast a heavy shade over the ground and take up space which might be utilized by white pine. It is a very serious problem to determine what should be done with these trees. The answer depends upon what sort of growth the residual stand will make, and what reproduction may be expected under existing marking practice. To help solve this question the present plot has been established.

Eyre was specially impressed with the importance of seed destruction by squirrels and the possible effect on natural reproduction, as he encountered this condition in the study of effect of fire killing on cone maturity. Last year Hatch recorded the squirrel theft of a good crop of cones on the methods-of-reproduction plots, resulting in a very small catch in the seed traps. This year Eyre assisted Kempff in girdling by fire at 15-day intervals a total of 12 white pines, which at the time of girdling, and until August 27, bore good cone crops. On September 1, only one cone - and that underdeveloped - remained on the 12 trees, squirrels having cut the rest in five days. If squirrels do as clean a job on isolated seed trees left on timber-sale areas, it is not surprising that western white pine reproduction is obtained with difficulty.

Weidman was able to give most of his time during August to his public requirements manuscript, with three short field trips, one to the Priest River branch at the time of the Forester's visit, one inspection of Haig's field party and work, and one to examine a prospective experimental forest in the larch-fir type on the Flathead Forest. This examination was made in company with Assistant District Forester Koch and Supervisor Hornby, following which Koch and Weidman failed to discover a suitable western yellow pine area. The larch-fir area appears to be very satisfactory for an experimental forest from the standpoint of accessibility, representative type conditions, merchantable timber readily salable, young age classes, etc. The yellow pine areas visited, on the other hand, are only partly in Federal ownership, with private holdings too numerous and too irregularly distributed to permit easy consolidation.

Although the Forester's visit, in company with Mr. Morrell, was very short, it was stimulating to have him with us. It was possible to show him several permanent sample plots on the experimental forest, including one thinning plot and four methods-of-cutting plots, the latter devoted to the white pine-hemlock problem. A number of points came up during a round-table discussion with members of the staff, on the problems of the white pine type, the availability of research results, and their application. This was not Major Stuart's first visit to the Priest River branch, as he was Chief of Silviculture in D-1 at the time the Experiment Station was founded in 1911, and contributed largely to the work at the Station during its first two years.

In the study of old cut-over areas, five situations were covered by the transect method by Haig and two assistants during August. On all of these areas - three were Forest Service and two private cuttings - at least twelve years had elapsed since logging allowing conditions to become fairly stabilized and permitting the collection of increment data on trees left in addition to the usual information on the amount and character of reproduction. Each of these areas contained some type of residual stand and the data collected should furnish interesting information on the health and growth of the live trees, and on the amount of loss since logging by windfall and death.

Practically the entire month, except for a few days used in obtaining core counts on yellow pine for Weidman, was spent on the transect study. Zehnder joined Ernst and Haig about the 13th and spent the remainder of the month with them. DeJarnette of the Pend Oreille National Forest, and W. W. White of the District Office, also spent some time on this project at the beginning of the month - White spending about a week with the transect-study crew, familiarizing himself with our methods and comparing notes on the method of taking increment data with a view to standardizing the District and Experiment Station methods. The Experiment Station method had already been changed slightly in several places with this end in view.

It is an interesting comment on the scarcity of suitable white pine cuttings ten years and older in this region to know that of some eighty cuttings listed as possibilities for work, only twenty-five were both in the white pine type and unburned since logging, and of these twenty-five, all of which were visited in the field, only five proved suitable for this type of work.

Early in August a large fire, just outside the Kaniksu Forest near Milan, Washington, offered an opportunity to use the sample-plot method of studying fire behavior. Eyre, Marshall, Waters and Gisborne drove from the branch station to the edge of the fire, selected the location for a plot, installed it and obtained data on burning between 8 a. m. and midnight of one day. The next morning was devoted to a study on the ground of the data obtained and the possibilities of obtaining better information. In the simple case represented by this plot, and with the slow spread of fire encountered, the sample-plot method proved to be easily applied, and appears to have given much more complete information than had ever been obtained before in this region by the observational method. Even with the simple conditions encountered, the four-man crew proved to be none too fast, although each man had studied the detailed instructions and knew exactly what jobs to perform and their order of execution. Four hours were required for surveying, cruising, mapping and sampling the fuels on this one-tenth of an acre plot. One outstanding observation was the fact that at the time the fire hit the plot, crowning out occasional small single trees, the air temperature was 93° F., the relative humidity 17 per cent, and the wind about 1/2 m.p.h.

still a period of 4 hours was required for the fire front to traverse the 100-foot length of the plot. Several square feet of duff surface, not approached by fire till after dusk, never was burned. The plot corners were permanently staked for later reference if desired.

Although several large fires have occurred in this District this year, no other fire-behavior plots were installed because of inaccessibility, because after early August the necessary assistance was not available, and because many of the fires were in old burns and complicated types not suited to preliminary work of this kind.

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DISTRICT 2

Roezer gave much time to marking and mapping a section of the badly infected mistletoe stand in the Station Forest. This area will be cut over and cleaned up this fall. Some laboratory work was done to check past results in the resistance of seedlings to excessive heat test, but no time has been found as yet to interpret the data.

A period was spent on the Arapaho Forest in remeasuring the three Engelmann spruce plots established in 1922 near Spruce Lodge. The cutting on these plots under a sale contract was badly administered, many tagged trees were destroyed in logging. A check made of the logging damage in 1924 apparently failed to account for all of the lost trees. The remeasurement indicated that the spruce has responded very little to opening of the stand, and no difference is to be noted in stimulation as affected by the various degrees of thinning. The alpine fir, as is to be expected, is making rapid growth, and appears to have been stimulated more or less in direct proportion with the degree of opening. Very little spruce reproduction is to be found on any of the plots, although that of alpine fir is quite abundant.

Three 1/4-acre plots are involved in the Meadow Creek thinning study in lodgepole pine; one of these is a check plot; one a light thinning made in 1921, in which only a few of the larger trees in the present approximately 50-year old stand were removed; while the third was heavily thinned in 1924 to $8\frac{1}{2}' \times 8\frac{1}{2}'$. Borings showed practically no increase in growth rate for the lightly thinned plot as compared with the check, but the trees in the heavily thinned stand show almost a three-fold increase over the original growth rate, and this acceleration followed immediately upon cutting.

During the following week a trip was made to the San Juan Forest to remeasure the group of three plots cut-over early in 1924 in a thrifty,

uneven-aged western yellow pine stand typical of the type in the south-western part of the District. These plots are in excellent condition. A surprisingly large average increase was found in practically all age-classes, except in the very few mature seed trees left, and five year increases of 1.5" in diameter were not uncommon.

The fall cone counts and observations in the western yellow pine, Douglas fir, and Engelmann spruce seed production studies will be made about the middle of the month. Cone collections will be limited to a few trees in the western yellow pine study, for the local seed crop in all three species is quite meagre. Supervisor Higgins of the Nebraska Forest, will assist Roeser in collecting cones from the trees designated in 1926 as likely seed sources for Nebraska planting in the Pine-ridge country of Nebraska, South Dakota, and Wyoming. This has been a year of abundant production in this territory.

The remaining plots of mistletoed western yellow pine in the pasture area of Block A will be marked and mapped, and Plots cut-over in 1923, will be remeasured. The check-plot in the virgin stand and the selection plot of the original Douglas fir cutting methods experiment at Fremont are also due for another remeasurement.

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OFFICE OF FOREST PRODUCTS - District One

D-1 Cottonwood for Paper and Pulp

No fear need be expressed for a ready market for the limited supply of black cottonwood in the Northern Rocky Mountain District. For years settlers had hoped for a market for the cottonwood stands contained on the alluvial deposits of the Kootenai River between Bonners Ferry, Idaho, and Port Hill, on the international boundary. A market has opened. For the past two years the Everett Pulp and Paper Company of Everett, Washington, has been quietly acquiring a controlling volume of stumps in that locality. This office has been informed that most of the stumps were purchased for not over 50¢ per M. At the present time the company pays \$5.50 per cord for 4-foot peeled pulpwood with a freight rate of \$3.50 per cord from Bonners Ferry to Everett and \$3.60 per cord from Port Hill to Everett.

Most of the pulp wood will be driven down the Kootenai to Port Hill where the company has constructed booms and a loading works at a cost of \$25,000. No estimate has been secured of the volume of cottonwood in the Kootenai Valley, but it is thought to be in excess of 100 million.

Other accessible commercial stands are located along the Clark Fork River from Pend Oreille Lake, in Idaho, to Paradise, Montana, and on the alluvial flats of the Bitterroot River in Montana.

Woods Waste in Logging

Mr. Anderson has just returned to the Office after having spent practically the entire field season since May 1 on this study. The survey of logged over areas in the white pine type is completed with the exception of the Callahan Creek Forest Service sale area. The yellow pine type in Northern Idaho has been covered and two camps in Montana have been worked. Thus, the survey in the yellow pine type is about three-fourths complete and will be finished before the end of the present field season, leaving only the lodgepole pine and larch-fir types. It is expected that these can be completed early next field season, since logging operations in these two types have been less important.

During August Mr. Bradner started the lodgepole survey on the West Yellowstone tie sale on the Madison Forest. The study has developed a very interesting relationship between stump diameter inside the bark and diameter breast high outside the bark in the two pines. In yellow pine the diameter inside the bark of stumps usually less than 18" in height is

practically identical with the diameter breast high outside the bark. In white pine a reduction of stump D.I.B. in the amounts indicated is necessary to obtain the correct D.B.H.

DIB 10 to 14 15 to 19 20 to 25 26 to 32

Reduction
for D.B.H. -1 -2 -3 -4

For stump D.I.B. over 32 inches each stump must be judged individually, since the variation in form is quite wide due to stump rot and other butt deformities. Here the reduction varies from 0 to 6 inches.

The above information can be used to good advantage in timber sales in making stump scales of timber cut in trespass or whenever a stump scale or estimate is needed.

Idaho-Montana Lumber Cut, 1927

Production records tabulated for District purposes from the 1927 Census were rechecked and summarized during the past month. New directory lists were typewritten and the card records maintained for each saw-mill were brought up to date.

A comparative statement of the total cut in Idaho and Montana for the past three years follows:

Lumber Cut In Ft. B. M.

| <u>State</u> | <u>1925</u> | <u>1926</u> | <u>1927</u> |
|--------------|----------------|----------------|----------------|
| Idaho | 1,140,575 | 947,471 | 923,899 |
| Montana | <u>388,654</u> | <u>378,698</u> | <u>396,487</u> |
| Total | 1,529,429 | 1,326,169 | 1,320,386 |

The Idaho cut for 1927 was about 2.5% less than that in 1926, while Montana shows an increase of 4.7% in 1927 as compared with the preceding year.

Production by Species 1927 - M. Ft. B.M.

| <u>Kind of Wood</u> | <u>Idaho</u> | <u>Montana</u> |
|---------------------|--------------|----------------|
| Idaho White Pine | 409,953 | 12,623 |
| Western Yellow Pine | 250,062 | 167,675 |
| Western Larch | 97,163 | 126,669 |
| Douglas Fir | 82,576 | 80,603 |
| All others | 84,145 | 8,917 |
| Total | 923,899 | 396,487 |
| Lath, M pcs. | 108,337 | 19,314 |
| Shingles, M pcs. | 9,464 | 214 |

Production by small mills cutting less than 50 M feet each year is not included in the above tables.

Lumber Prices and Movement

| Avg. Mill-Run Prices | Annual 1927 | Annual 1928 | First Q. 1928 | Second Q. 1928 | July 1928 |
|----------------------|----------------|----------------|------------------|-------------------|--------------|
| Idaho White Pine | \$35.86 | \$30.17 | \$30.20 | \$31.00 | \$31.57 |
| Western Yellow Pine | 25.17 | 24.19 | 26.55 | 25.52 | 24.31 |
| Larch-Fir | 18.19 | 16.38 | 17.60 | 18.23 | 18.97 |
| White Fir | 17.41 | 16.80 | 17.89 | 17.35 | 19.53 |
| Spruce | 23.39 | 25.67 | 24.35 | 21.21 | 21.06 |
| Shipment and Cut | | <u>1927</u> | | <u>1928</u> | |
| Shipment | | 126,091 M | | 159,200 M | |
| Cut | | 149,824 M | | 182,299 M | |

Miscellaneous

A recent survey of the Missoula building records indicates that dwellings in this typical western Montana town are 92½ wooden or frame construction and 8½ brick.

OFFICE OF FOREST PRODUCTS - District Six

Western Yellow Pine Milling and Logging Study

The working plan for this study, which is to be conducted in connection with the milling and logging operations of the Shevlin-Hixon Company, Bend, Oregon, was completed by Gibbons during the month.

The principal objectives of the study, in general, are to determine: (1) The yield and value of lumber, by grades, now obtained from both logs and trees of different diameters. (2) The comparative labor and other costs of logging and milling logs and trees of different diameters. An investigation such as is contemplated should assist materially in working out fundamentally-sound forest utilization and management policy for the region. The data to be obtained will show the comparative value, together with the comparative production cost, of lumber from logs and trees of different diameter, giving a basis for determining the minimum sized tree which should be taken under selective logging.

The project may be considered as a cooperative undertaking, to be made by the Offices of Forest Products and Forest Management and the Deschutes National Forest, District 6, and the Pacific Northwest Forest Experiment Station. The Forest Experiment Station arranged for the selection and description of the milling test timber, and will direct the sorting of the test logs at the mill; the section of the working plan dealing with the selection and description of the timber was prepared in large part by Director Munger. The logging phase of the study will be made by the Office of Forest Products, work requiring the services of one man in the field for a month and two men for an additional six weeks; in this connection Spelman spent the last twenty days of the month in the field. During the course of the milling study, which starts on September 10 and continues for about two weeks, the Office of Forest Products will contribute four men, a chief of party, a lumber marker, and two time-study men; the Office of Forest Management three men, a scaler and two lumber tallymen; and the Deschutes National Forest an assistant scaler. In addition to the above personnel two high-class lumber inspectors will be employed.

Douglas Fir Air-Seasoning Study

Mention was made in last month's report to the Douglas fir Common air-seasoning study conducted at Mill B of the Weyerhaeuser Timber Company, Everett, Washington. During the month Johnson completed compiling the data and preparing the report.

This study consisted of four piles of 1x12-16' Douglas fir, and included Selected Common, No. 1 Common and No. 2 Common. It included two variables: 3-inch versus 4-inch spacing between boards in a layer and special 1x4-inch stickers versus self-sticking. Yard piled from June 8 to June 18, the stock dried to an average moisture content of 16.8 per cent. The average moisture content for individual piles did not vary more than 0.8 per cent from the general average. The variation in moisture content throughout the individual piles, as shown by the wholeboard samples, seldom exceeded 3 per cent.

The difference in the drying rate between piles with 4-inch spacing between boards in a layer and those with 3-inch spacing was so small as to be negligible, not only in the piles as a whole but in comparable parts of the piles.

There was no degrade in seasoning or machining the Selected Common stock.

The total degrade in seasoning and machining the No. 1 Common in the special-stuck piles amounted to 17.69 per cent, not including a trim loss of 0.79 per cent. In the self-stuck piles the degrade was 33.51 per cent, with an additional trim loss of 0.81 per cent. The seasoning degrade, due entirely to surface checks, in the special and self-stuck piles was 3.94 and 20.60 per cent respectively; in the self-stuck piles 77 per cent of this loss occurred in the stickers. The machining degrade was small in both instances; 0.56 per cent in the special-stuck and 0.83 per cent in the self-stuck piles. There were two sources of loss (degrade and trim) that cannot be charged to the seasoning or machining. A considerable amount of stock contained knots encased on one board face and intergrown on the other face. In machining the intergrown portion of the knots, in many instances, was dressed off leaving the knots loose. Degrade from this source amounted to 12.92 per cent in the special-stuck piles and 12.35 per cent in the self-stuck piles. The loss in trim due to splits in handling the stock amounted to 0.52 and 0.23 per cent respectively.

In the No. 2 Common the degrade was small, amounting to 0.44 per cent in the special-stuck and 2.51 per cent in the self-stuck piles. The trim loss was 0.30 and 0.12 per cent respectively. In the self-stuck piles, with the degrade confined to the air-seasoning, 71 per cent of the loss occurred in the stickers.

General Survey of Wood Waste in Logging Camps of the Douglas Fir Region

Because of a severe illness Hodgson was out of the Office the last half of the month. The revision of the tentative draft of his report, to which reference was made in last month's report, is now ready for typing.

In its August issue Industrial and Engineering Chemistry published "Paper Pulp from Logging Waste in the Douglas Fir Region," the paper read by Hodgson at the wood pulp and paper industry symposium of the Pacific Northwest Regional meeting of the American Chemical Society, held at Reed College, Portland, April 6 and 7, this year, under the auspices of the Oregon Section and Reed College. The paper dealt with a few of the more general phases of our current study, at the same time stressing the great amount of material suitable for wood pulp which is now being left in the woods.

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FOREST TAXATION INQUIRY

New Hampshire

It was necessary to withdraw Hammar and Pingree from the New Hampshire study early in this month, leaving Murphy to carry on with such local assistants as he could obtain. This has naturally slowed down the work. However, the collection of field data in the town of Loudon has been largely completed, and the work in the towns of Richmond and Fremont begun. Further progress has been made in the compilation of the state financial statistics.

Pacific Northwest

The work in Oregon is proceeding along two principal lines, the first being a study of the relation of taxation to the business of owning and operating timber, and the second a study of the operation of the tax system in relation to different classes of property as exemplified in selected counties representative of the different conditions to be found in the state. The third part of the general plan, a study of state and county finances, is being held in abeyance owing to the failure to obtain the services of an economist to do this work.

The study of the relation of taxation to the timber industry is being conducted by the questionnaire method, supplemented by as much personal contact as possible. Much of the time of Fairchild and Hall for the entire month has been occupied in preparing these questionnaires, or confidential statements, as they are now called, and in paving the way for sending them out. Many conferences have been held with lumbermen, foresters, and tax authorities, and formal endorsements of organizations representing the timber industry and forest interests of Oregon and Washington, have been obtained. There has been considerable publicity of a favorable character. The form statements have been printed through the cooperation of the Oregon State Board of Forestry, and will be mailed out, together with a letter of transmittal and a leaflet containing endorsements, the first week in September.

Studies of Selected Counties

The counties selected for special study in Oregon are Baker, Clatsop, Coos, Grant, Klamath, Lane, and Tillamook.

The study of the county tax system was begun experimentally by Herbert, and a detailed outline prepared. Hammar and Pingree, who arrived on August 11, were assigned to this project, in addition to Herbert. Lane and Coos counties have been practically completed, and Klamath is

under way. Records of real estate transactions showing assessed valuations and considerations on file at the offices of the State Tax Commission have been copied for all of the selected counties in Oregon.

Conferences and Meetings

During the last week of August, Fairchild attended the National Tax Association meeting at Seattle, taking advantage of the occasion to make contact with Washington tax officials, railroad tax representatives and others who can assist in the work of the Inquiry.

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RANGE RESEARCH

Washington

Forestry Almanac Chapter

At Mr. Betts' request Dayton prepared a brief chapter on range research for inclusion in the next issue of the Forestry Almanac; this was called for on short order and hence is not of encyclopaedic character. Dayton also, at Dr. Smith's request, assisted in making certain revisions of the range research chapter of the Forester's annual report.

FORAGE INVESTIGATIONS

Standardization of Plant Names

Dr. Coville came over during the month with the list of host currants and gooseberries involved in white-pine blister-rust infestations; with Dayton attempt was made to iron out discrepancies in English name usage between the Forest Service and the Bureau of Plant Industry.

Retirement of Miss Gittings

On August 31st Miss Nellie B. Gittings, the plant mounter in the section of forage investigations, retired at the age of 72. She was on leave for the entire month. Friends in the branch and in the Washington office presented her on her birthday with a handsome brooch and umbrella. The position (SP-2) has been reallocated as SP-4 but has not yet been filled.

Review of "In" Photographs in the General Collection

Dayton finished during the month his (necessarily piecemeal) review of the photographs of individual tree and other plant pictures in the general photographic collection in the Washington office, over which Miss Barksdale so ably presides. This review was made at the request of the Branch of Public Relations. In these files 3389 photographs were accepted and 1087 rejected (being duplicates, obviously inferior, or superfluous). Recommendation was made that a number of

the pictures be transferred to other file designations, and that a considerable number of others be discarded when better pictures of the same subjects are obtained. 33 pictures of individual species from the "Gr." files were also rejected. There is a wealth of good dendrological and botanical pictures in the general collection, but still there is need for high-grade photographs of the more important species of our National Forest flora.

Plant Routine During August

60 plants, representing 2 collections, were sent to the Bureau of Plant Industry for formal determination. 883 plants, representing 22 collections, were reported out to the Districts. 464 photostatic prints of economic notes were sent to the District offices.

Plants of Especial Interest: Range Extensions, etc.

A very rare grass, Stipa stillmannii Bol., hitherto known only from the original collection of Bolander, has been added to the Forest Service herbarium through the efforts of Mr. Leland S. Smith. This plant bears his no. 1880 and was collected by him on the Tahoe National Forest in California. Dr. Hitchcock has asked for some of this material for the National Herbarium.

Ranger Frank E. Gray in a recent Nevada National Forest collection has added three plants to the known flora of that State, viz.: his no. 337, a bluegrass, Poa cusickii, part of which specimen is being sent Mrs. Chase for the National herbarium; no. 361, a monkshood, Aconitum bakeri, hitherto thought to be confined to Wyoming, Colorado, and Utah; and no. 247, another monkshood, Aconitum glaberrimum, designated in the books as ranging from southern Utah to northern Arizona.

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

Satisfactory rains fell during the month of August and good growth resulted except in the 2 summer pastures on the south section of the station range. Apparently the grass on this area (principally Hilaria mutica) did not receive the flooding required for good growth, because the same type of range in the north part of the reserve has already produced an excellent forage crop.

Condition of Stock

Due to the failure of the summer range to develop most of the breeding herd has remained in the yearlong pasture. Cows and calves are in excellent shape, and 12¢ has been offered for the calves, fall delivery.

Improvement

The cooperator has rebuilt the division and boundary fences on the north portion of the Reserve and is hauling gravel and rock for the new steel water storage tank and drinking tubs at Red Lake Well.

Canfield spent 3 days in building an additional storage room for the government dwelling house.

Investigative Work

The black grama and tobosa clipping studies were started, but as both are located in the south end of the Reserve, which is dry this year, the clippings have been intermittent.

The growing season was well advanced on portions of the reserve, so that on August 9, the quadrat season was opened. Twenty-five quadrats on the reserve and 5 on outside range were charted. The remaining 90 plots on this year's schedule will be mapped as quickly as they reach the proper stage of growth.

The determinations of the 122 plants composing the fifteenth Jornada collection were received from the Washington Office, and the plants were mounted, indexed, and placed in the herbarium. An additional trip to San Andreas Peak was made in quest of plants new to Jornada records.

Personnel

On August 6, Ranger Vance A. Thomas, from the Ruidoso District of the Lincoln National Forest, reported to the Jornada for a two-weeks detail. He saw most of the reserve and lent a hand in all the current work from mounting plant specimens to charting quadrats. On leaving the station, he said, "The Jornada Range Reserve is a good place to convince any doubting Thomas that very conservative stocking pays - -."

When Ranger Thomas completed his detail of 2 weeks on the Jornada, Campbell returned with him to the Ruidoso District of the Lincoln and

spent 5 days there from August 20 to 24. A sample plot and quadrat were established on one allotment while the remainder of the time was spent in looking over the district. Campbell and Ranger Thomas collected 93 plant specimens, most of which are being forwarded to the Washington Office for determination. On leaving the Ruidoso District, Campbell expressed his satisfaction with the visit and his approval of range conditions there.

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SANTA RITA

Natural Revegetation

Growth to date, over most of the Reserve, is considerably below normal due to deficient rainfall as well as continued dry spells between rains. Growth started generally about the middle of July but received a severe setback during the latter part of the month. On the first of August a good general rain started growth again but entire lack of rain from the first to the twenty-first resulted in a negligible amount of growth. On the twenty-first and twenty-second general rains over the Reserve started growth again and have assured a fair stand of forage without any additional rain.

The uneven distribution of rain is indicated in the August records of Proctor and Box Stations; in the former 5.63 inches of rain fell while only 3.24 inches was recorded at the latter which is only two miles distant. Desert Station recorded a rainfall of only 1.57 inches for the month of August.

Water Development

The present Summer has resulted in a very severe test of the water developments on the Reserve and while the water supply has been sufficient to keep all the cattle plentifully supplied, with but little shifting, it is apparent that more adequate development is necessary in order to insure a greater margin of safety in dry periods. Parker is having three of his main wells deepened and is planning on installing additional storage tanks at some of his main watering places so as to insure an ample surplus of water on hand at all times.

The well at Florida Station, in addition to being practically dry for the last two months, caved in late in August and had to be retimbered. Men had already been secured to retimber the well but it caved in on the morning they started work. After cleaning it out a tunnel was started at the bottom of the well but work on this had to be suspended when our reserve supply became exhausted and made it necessary to utilize what little water the well produced.

Handling Stock

Cattle continue in good to excellent condition and indications point toward all aged stock being in prime condition for an early fall market. The entire calf crop of the Reserve has been contracted for \$40 per head and several car loads of cows will be sold at prices ranging from \$65. to \$75. per head.

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